12 THE DESIGN OF THE TAX SYSTEM

WHAT'S NEW IN THE SIXTH EDITION:

All tables have been updated to the most recently available numbers. Discussion of transfer payments to the poor and unemployed has been added. Information on the Obama healthcare reform bill has been added. Two new *In the News* boxes on "The Temporarily Disappearing Estate Tax" and "The Value Added Tax" have been added.

LEARNING OBJECTIVES:

By the end of this chapter, students should understand:

- how the U.S. government raises and spends money.
- the efficiency costs of taxes.
- alternative ways to judge the equity of a tax system.
- why studying tax incidence is crucial for evaluating tax equity.
- the trade-off between efficiency and equity in the design of a tax system.

CONTEXT AND PURPOSE:

Chapter 12 is the third chapter in a three-chapter sequence on the economics of the public sector. Chapter 10 addressed externalities. Chapter 11 addressed public goods and common resources. Chapter 12 addresses the tax system. Taxes are inevitable because when the government remedies an externality, provides a public good, or regulates the use of a common resource, it needs tax revenue to perform these functions.

The purpose of Chapter 12 is to build on the lessons learned about taxes in previous chapters. We have seen that a tax reduces the quantity sold in a market, that the distribution of the burden of a tax depends on the relative elasticities of supply and demand, and that taxes cause deadweight losses. We expand the study of taxes in Chapter 12 by addressing how the U.S. government raises and spends money. The difficulty of making a tax system both efficient and equitable is then discussed.

KEY POINTS:

- The U.S. government raises revenue using various taxes. The most important taxes for the federal government are individual income taxes and payroll taxes for social insurance. The most important taxes for state and local governments are sales taxes and property taxes.

- The efficiency of a tax system refers to the costs it imposes on taxpayers. There are two costs of taxes beyond the transfer of resources from the taxpayer to the government. The first is the deadweight loss that arises as taxes alter incentives and distort the allocation of resources. The second is the administrative burden of complying with the tax laws.

- The equity of a tax system concerns whether the tax burden is distributed fairly among the population. According to the benefits principle, it is fair for people to pay taxes based on the benefits they receive from the government. According to the ability-to-pay principle, it is fair for people to pay taxes based on their capability to handle the financial burden. When evaluating the equity of a tax system, it is important to remember a lesson from the study of tax incidence: The distribution of tax burdens is not the same as the distribution of tax bills.

- When considering changes in the tax laws, policymakers often face a trade-off between efficiency and equity. Much of the debate over tax policy arises because people give different weights to these two goals.

CHAPTER OUTLINE:

I. A Financial Overview of the U.S. Government

> In order for this material to be relevant, you will want to update it from time to time. Data on government receipts and expenditures can be found easily on the Internet or through the most recent edition of the Economic Report of the President.

A. Figure 1 shows the level of government revenue in the United States, including federal, state, and local governments, as a percentage of total income for the U.S. economy.

Figure 1

1. The role of government has grown substantially over the past century.

2. The government's revenue from taxation has grown at a faster rate than the economy's level of income.

B. Table 1 compares the tax burden for several major countries, as measured by the central government's tax revenue as a percentage of the nation's total income.

Table 1

1. The United States falls in the middle of the list.

2. Tax burden in the United States is low when compared with that of European countries, but is high when compared with that of other areas of the world.

C. The Federal Government

1. Receipts

a. Table 2 reports the receipts of the federal government in 2009.

Table 2

b. Total receipts were $2,105 billion or $6,846 per person.

c. The largest source of revenue is the individual income tax.

d. A family's income tax liability is how much it owes in taxes based on income. This tax is not proportional to income. It is based on income minus deductions, and the tax rate rises as income rises. Table 3 presents federal tax rates for 2010.

Table 3

e. Other important revenue sources include payroll taxes (social insurance taxes), the corporate income tax, and excise taxes.

2. Spending

a. Table 4 reports where the federal government spent its budget in 2009.

Table 4

b. Total spending was $3,518 billion or $11,441 per person.

c. The largest category of expenditure is Social Security. The second largest expense is national defense.

d. Other important categories of expenditure include income security programs, Medicare, and net interest on the federal debt.

3. Definition of **budget deficit: an excess of government spending over government receipts.**

4. Definition of **budget surplus: an excess of government receipts over government spending.**

Activity 1—Alphabet Soup: The Role of the Government

Type: In-class assignment
Topics: The role of government
Materials needed: None
Time: 15 minutes
Class limitations: Works in any size class

Purpose
This assignment shows that many government activities exist in a market economy.

Instructions
Ask the students to list as many government-provided goods and services as possible. They should include activities at the federal, state, and local levels.

Then ask them to list all the "alphabet" agencies (FBI, CIA, USDA, etc.).

The most important question to ask is "WHY?" Why, in a predominantly market economy, does the government play so many roles?

Common Answers and Points for Discussion
Students should be able to list dozens of government activities and nearly as many agencies.

The rationale for government action can include:

- Creating an institutional framework for markets (laws, courts, money, SEC)
- Addressing market failure (national defense, education, highways, EPA)
- Addressing monopoly (antitrust, public utilities, FTC)
- Addressing equity and income distribution (Social Security, food stamps)
- Macroeconomic stability (fiscal policy, monetary policy)
- Financing the above activities (taxes, bonds, IRS).

D. *Case Study: The Fiscal Challenge Ahead*

1. In 2009, the federal government had a budget deficit of $1,413 billion.

2. Long-term projections of the government's budget show that this is expected to rise dramatically in the decades ahead.

Figure 2

a. The population ages 65 and older is growing; thus, Medicare and Social Security expenditures will rise as well.

b. In addition, the costs of Medicare are affected by the rising cost of medical care.

E. State and Local Government

1. Receipts

Table 5

a. Table 5 reports the receipts from state and local governments for 2007.

b. Total receipts were $2,329 billion or $7,574 per person.

c. The two most important taxes for state and local governments are sales taxes and property taxes.

d. State and local governments also levy individual and corporate income taxes.

e. State governments also receive funding from the federal government.

2. Spending

a. Table 6 shows how state and local governments spent their budgets in 2007.

Table 6

b. The largest category of spending was education, while the second largest category was public welfare.

II. Taxes and Efficiency

A. Well-designed tax policies minimize the deadweight losses that occur when taxes distort incentives. They also minimize the administrative burdens that taxpayers face when complying with tax laws.

B. Deadweight Losses

1. Taxes lead to deadweight losses because they lower total surplus.

Provide students with several examples of how taxes lead to an inefficient outcome. Some examples to discuss include an inefficient shifting of productive activity from the market sector to the household sector, diminished saving, and increased leisure.

2. *Case Study: Should Income or Consumption Be Taxed?*

a. Because interest income is taxed, the current income tax laws discourage saving.

b. If consumption (instead of income) is taxed, this disincentive disappears.

c. European nations tend to rely more on consumption taxes than does the United States.

3. *In the News: The Temporarily Disappearing Estate Tax*

a. The U.S. tax on large estates expired in January 2010 and is expected to resume in January 2011.

b. This is an article from *The Wall Street Journal* describing the strange incentives created by this odd break in the tax.

C. Administrative Burden

1. The current tax system is quite burdensome because of the large amount of paperwork required both when filling out tax forms and keeping records throughout the year.

For most undergraduate students, this burden may seem somewhat trivial. Use some real-world examples of actual compliance costs to underscore this important aspect of taxation. Use some personal examples if appropriate.

2. Many taxpayers spend resources hiring accountants and tax lawyers.

    a. People often need help filling out complex tax forms.

    b. Individuals may also want to learn how to arrange their affairs to reduce their tax burden.

D. Marginal Tax Rates versus Average Tax Rates

1. Definition of **average tax rate: total taxes paid divided by total income.**

2. Definition of **marginal tax rate: the extra taxes paid on an additional dollar of income.**

3. The average tax rate measures the sacrifice made by a taxpayer; the marginal tax rate measures how much the tax system distorts incentives.

ALTERNATIVE CLASSROOM EXAMPLE:
Income = $100,000

Tax Brackets	Tax Rate:
$0–$20,000	0%
$20,001–$50,000	15%
$50,001 +	25%

Tax liability = (0.15)($30,000) + (0.25)($50,000)= $4,500 + $12,500 = $17,000
Average tax rate = $17,000/$100,000 = 17%
Marginal tax rate = 25%

E. Lump-Sum Taxes

1. Definition of **lump-sum tax: a tax that is the same amount for every person.**

2. For this type of tax, the marginal tax rate is equal to zero.

3. This is the most efficient type of tax because it does not distort incentives and thus has no effect on total surplus. There is also little administrative burden with this type of tax.

4. However, a lump-sum tax would take the same amount from the poor and the rich, which most people would view as unfair.

III. Taxes and Equity

A. The Benefits Principle

1. Definition of **benefits principle: the idea that people should pay taxes based on the benefits they receive from government services.**

2. This principle tries to make public goods similar to private goods.

3. An example of this would be the tax on gasoline, especially if revenues from the tax are used to build or maintain roads.

B. The Ability-to-Pay Principle

1. Definition of **ability-to-pay principle: the idea that taxes should be levied on a person according to how well that person can shoulder the burden.**

2. Definition of **vertical equity: the idea that taxpayers with a greater ability to pay taxes should pay larger amounts.**

Table 7

a. Three tax systems: proportional, regressive, and progressive.

b. Definition of **proportional tax: a tax for which high-income and low-income taxpayers pay the same fraction of income.**

c. Definition of **regressive tax: a tax for which high-income taxpayers pay a smaller fraction of their income than do low-income taxpayers.**

d. Definition of **progressive tax: a tax for which high-income taxpayers pay a larger fraction of their income than do low-income taxpayers.**

e. *Case Study: How the Tax Burden Is Distributed* – Table 8 shows that the tax burden in this country is highly progressive. In addition, studies have shown that, if transfer payments are also taken into account, the degree of progressivity is substantial.

Table 8

3. Definition of **horizontal equity: the idea that taxpayers with similar abilities to pay taxes should pay the same amount.**

C. Tax Incidence and Tax Equity

1. The burden of a tax is not always borne by who pays the tax bill.

2. Example: tax on fur coats. This will ultimately affect those who sell and produce the fur coats because the quantity of fur coats demanded will fall due to the increase in price.

3. *Case Study: Who Pays the Corporate Income Tax?*

a. The corporate income tax is popular among voters because a corporation is nonhuman and faceless.

b. However, the burden of the corporate tax falls on stockholders, customers, and workers.

c. An increase in corporate taxes means an increase in the cost of producing the product. Firms will cut back production (which lowers supply and raises the price to the consumer) and possibly lay off workers (which causes unemployment, lower wages, or both).

D. *In the News: The Value Added Tax*

1. As government deficits grow, policymakers look for new revenue sources such as a value added tax.

2. This is an article from *The New York Times* discussing the pros and cons of such a tax.

IV. Conclusion: The Trade-off Between Equity and Efficiency

Activity 2—Tax Alternatives

Type: In-class assignment
Topics: Taxes and fairness
Materials needed: None
Time: 20 minutes
Class limitations: Works in any size class

Purpose
The impact of taxes can be examined in a variety of ways. This exercise helps students think about the different effects of taxes on different goods. Taxes that may be appealing because they minimize deadweight loss may be undesirable for equity reasons.

Instructions
Tell the class, "The state has decided to increase funding for public education. They are considering four alternative taxes to finance these expenditures. All four taxes would raise the same amount of revenue." List these options on the board:

1. A sales tax on food
2. A tax on families with school-age children
3. A property tax on vacation homes
4. A sales tax on jewelry

Ask the students to answer the following questions. Give them time to write an answer, then discuss their answers before moving to the next question:

A. Analyze these taxes using the benefits principle.
B. Analyze these taxes using the principle of horizontal equity.
C. Classify each tax as progressive, proportional, or regressive.
D. Which tax would you choose to finance education? Explain.

Common Answers and Points for Discussion

A. Are the taxes related to the benefits received?
   1. A sales tax on food: This broad-based tax would be appropriate if citizens, as a whole, receive benefits from education. To the extent that education provides positive externalities, this tax could be justified on the benefits principle.
   2. A tax on families with school-age children: This tax burden would be borne mainly by those who have the highest benefits. The exceptions would be families who choose private schools or home schooling; these households would pay the taxes but not receive the benefits.

3. A property tax on vacation homes: This tax is probably the worst from a benefits perspective. Many vacation homeowners may be from other states and receive minimal, if any, benefits from supporting education.
4. A tax on jewelry: This tax is also weak from the benefits perspective. There is little reason to think jewelry buyers would disproportionately benefit from better public education.

B. Are taxes the same for households earning the same income?
None of these taxes is horizontally equitable. They fall disproportionately on households who:
1. buy more food.
2. have school-age children.
3. own vacation homes.
4. buy jewelry.

The food tax might be the best from this perspective.

C. Vertical equity
1. A sales tax on food
Regressive—lower income households spend a larger portion of their income on food.
2. A tax on families with school-age children.
Regressive—lump-sum taxes have a bigger percentage impact on low incomes.
3. A property tax on vacation homes.
Progressive—higher income households are more likely to own vacation homes, and to own more expensive vacation properties.
4. A sales tax on jewelry
Progressive—higher income households will typically buy more expensive jewelry.

D. Which Tax?
No single tax satisfies all equity concerns. If market distortions are also considered, the decision becomes more complex. This question can generate good discussion about the trade-offs between different taxes. Many times students will volunteer additional tax options—income taxes are a common suggestion.

taxes. In many cases, the burden of the tax is borne by individuals other than those who actually pay the tax.

Questions for Review

1. Over the past century, the government's tax revenue has grown more rapidly than the rest of the economy. The ratio of government revenue to GDP has increased over time.

2. The two most important sources of revenue for the U.S. federal government are individual income taxes (about 43% of total revenue) and social insurance taxes (about 42%).

3. Corporate profits are taxed first when the corporate income tax is taken out of a corporation's income. When the profits are used to pay dividends to the corporation's shareholders, they are taxed again through individual income tax.

4. The burden of a tax to taxpayers is greater than the revenue received by the government because: (1) taxes impose deadweight losses by reducing the quantity of goods produced and purchased to below their efficient level; and (2) taxes entail a costly administrative burden on taxpayers.

5. Some economists advocate taxing consumption rather than income because taxing income discourages saving. A consumption tax would not distort individuals' saving decisions.

6. The marginal tax rate on a lump-sum tax is zero. This type of tax has no deadweight loss, because it does not distort incentives.

7. Wealthy taxpayers should pay more taxes than poor taxpayers should because: (1) they benefit more from public services; and (2) they have a greater ability to pay.

8. Horizontal equity refers to the idea that families in the same economic situation should be taxed equally. The concept of horizontal equity is hard to apply because families differ in many ways, so it is not obvious how to tax them equitably. For example, two families with the same income may have different numbers of children and different levels of medical expenses.

Problems and Applications

1. The federal government had a budget deficit in 2010. Policymakers expect budget deficits over the next decade.

2. a. The increase in revenue of the total government is attributable more to increases in state and local government revenue than to federal government revenue. In 1960, state and local government revenue was 33% of total government revenue; by 2008, it had risen to almost 49%.

   b. Personal income taxes account for a bit less of the total revenue of federal and state and local governments now; social insurance taxes account for a substantially greater proportion; and corporate taxes account for a lower.

   c. Transfer payments now account for a much greater proportion of the total expenditures of federal and state and local governments, while purchases account for a much smaller proportion.

3. a. If the number of retirees is rising and total expenditures are frozen, then benefits per retiree will decline over time. Because the number of workers is rising, albeit slowly, tax payments per worker would decline slowly over time.

   b. If benefits per retiree were frozen, total expenditures would rise quickly, along with the number of retirees. To pay for the increased expenditures, tax payments per worker would rise, because the number of workers isn't growing as rapidly as the number of retirees.

   c. If tax payments per worker were frozen, total expenditures would rise slowly, at the same rate as the growth rate of the number of workers. Because the number of retirees is rising more rapidly, benefits per retiree would decline over time.

   d. The answers to Parts (a), (b), and (c) suggest there is no easy solution. Either workers will pay more per person or retirees will get fewer benefits per person. Policymakers may eventually be forced to compromise, both reducing benefits per retiree and increasing tax payments per worker.

4. If you earn $20,000 a year, then you pay federal income taxes in two parts: 10% on the first $8,375 of income and 15% on the amount above $8,375. Thus, your federal income taxes are ($8,375 × 0.10) + ($11,625 × 0.15) = $837.50 + $1743.75 = $2,581.25. You also pay $20,000 × 0.153 = $3,060 in federal payroll taxes and $20,000 × 0.04 = $800 in state income taxes, for a total tax bill of $6,441.25. Your average tax rate is $6,441.25/$20,000 = 0.322 = 32.2%. Your marginal tax rate is 0.15 + 0.153 + 0.04 = 0.343 = 34.3%.

   If you earn $40,000 a year, then you pay federal income taxes in three parts: 10% on the first $8,375 of income, 15% for additional income up to $34,000, and 25% for the remaining $6,000 of income. Thus, your federal income taxes are ($8,375 × 0.10) + ($25,625 × 0.15) + ($6,000 × 0.25) = $837.50 + $3,843.75 + $1,500 = $6181.25. You also pay $40,000 × 0.153 = $6,120 in federal payroll taxes, and $40,000 × 0.04 = $1,600 in state income taxes. Your total tax bill is $13,901.25. Your average tax rate is $13,901.25/$40,000 = 0.348 = 34.8%. Your marginal tax rate is 0.25 + 0.153 + 0.04 = 0.443 = 44.3%.

5. Excluding food and clothing from the sales tax is justified on equity grounds because poor people spend a greater proportion of their income on those items. By exempting them from taxation, the system makes the rich bear a greater burden of taxation than the poor. From the point of view of efficiency, however, excluding food and clothing from the sales tax is inefficient, because the incentives to purchase food and clothing rather than other items are likely affected by this tax exemption. This leads to an inefficient allocation of resources. In addition, because the demand for food and clothing is likely to be relatively inelastic, the deadweight loss from a tax on these goods would be relatively small (when compared with a tax on a good whose demand is relatively elastic).

6. a. An individual must pay taxes on the asset only when he or she sells it. Thus, this tax law affects the individual’s decision of whether to keep or sell the asset. Tax revenues on accrued capital gains are only received by the government when an individual actually sells the asset. Lowering the tax rate on capital gains may induce individuals to sell assets that they have been holding to avoid paying the taxes on the accrued capital gains.

   b. Because capital gains are not realized and thus taxed until the investment is sold, investors can avoid the tax by not selling the investment. When capital gains taxes are lowered, even temporarily, the investor has an incentive to sell the investment while the tax is lower. Thus, sales to realize capital gains will increase at the lower rate and so will tax revenue on the increased volume of transactions.

   c It is inefficient to tax only realized capital gains because it distorts the incentives an individual faces with regard to keeping or selling a particular asset. However, it may be difficult to estimate the rise in the value of an asset prior to its sale.

7. If the state raises its sales tax from 5% to 6%, it is not plausible that sales tax revenue will increase 20%. The increase in the tax rate is 20%, so the only way tax revenue could increase 20% would be if total spending didn't fall in response to the tax increase, which is unlikely. Instead, the higher tax would raise the price of goods, so people would spend less. Thus, tax revenue might go up, because the tax rate is higher, but by less than 20%. There is a possibility that tax revenues will fall.

8. The effect of the Tax Reform Act of 1986 on interest payments was to reduce consumer debt and increase home equity debt. People started financing general expenditures through home equity loans and paid down their mortgages less quickly.

9. a. The fact that visitors to many national parks pay an entrance fee is an example of the benefits principle, because people are paying for the benefits they receive.

   b. The fact that local property taxes support elementary and secondary schools is an example of the ability-to-pay principle, because if you own more expensive property, you must pay more tax.

   c. The setup of airport trust funds is an example of the benefits principle, because use of the airport generates tax revenue that pays for upkeep of the airport.

10. a. For the proportional tax system, the average tax rate is 25% whether a person earns income of $50,000, $100,000, or $200,000.

    For the regressive tax system, the average tax rate is 30% for someone earning $50,000, 25% for someone earning $100,000, and 20% for someone earning $200,000.

    For the progressive tax system, the average tax rate is 20% for someone earning $50,000, 25% for someone earning $100,000, and 30% for someone earning $200,000.

    b. For the proportional tax system, the marginal tax rate as income rises from $50,000 to $100,000 is the increase in taxes ($12,500) divided by the increase in income ($50,000) = 25%. The marginal tax rate as income rises from $100,000 to $200,000 is the increase in taxes ($25,000) divided by the increase in income ($100,000) = 25%.

    For the regressive tax system, the marginal tax rate as income rises from $50,000 to $100,000 is the increase in taxes ($10,000) divided by the increase in income ($50,000) = 20%. The marginal tax rate as income rises from $100,000 to $200,000 is the increase in taxes ($15,000) divided by the increase in income ($100,000) = 15%.

    For the progressive tax system, the marginal tax rate as income rises from $50,000 to $100,000 is the increase in taxes ($15,000) divided by the increase in income ($50,000) = 30%. The marginal tax rate as income rises from $100,000 to $200,000 is the increase in taxes ($35,000) divided by the increase in income ($100,000) = 35%.

    c. In the proportional tax system, the average tax rate equals the marginal tax rate. In the regressive tax system, the marginal tax rate is less than the average tax rate and both tax rates decline as income rises. In the progressive tax system, the marginal tax rate is greater than the average tax rate and both tax rates rise as income rises. The marginal tax rate is relevant to someone deciding whether to accept a job that pays slightly more than her current job, because it tells her how much of the extra income she will be able to keep after taxes. For judging the vertical equity of the tax system, the average tax rate is relevant, because vertical equity suggests that people with a greater ability to pay should pay a larger amount.

11. a. If the deduction for mortgage interest were eliminated, fewer people would desire to hold mortgages or purchase homes. This would impact housing markets and housing values. The removal of this deduction will likely improve vertical equity because higher income households tend to hold larger mortgages and thus currently get larger deductions. It would also improve horizontal equity because individuals in similar

circumstances would be treated equally, whether or not they own their home, have a mortgage, or rent. Efficiency would improve for two reasons: less distortion in incentives and a smaller amount of paperwork in filing taxes.

b. If the deduction for state and local taxes was eliminated, the marginal tax rate on income will rise and this reduces the incentive to work. This would lead to inefficiency. Vertical equity would be improved, while horizontal equity would be unaffected.

c. If the deduction for charitable contributions were eliminated, fewer dollars would be donated to charities. This would reduce the provision of some public goods (such as public television). Vertical equity would be improved, assuming that charitable contributions are positively related to income. Horizontal equity would also be improved because individuals in similar circumstances would pay the same level of taxes, whether or not they donated to charities.